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— COMMITTED TO PROTECTION OF THE ENVIRONMENT —

COMPREHENSIVE MONITORING PROGRAM

Contract Number DAAA15-87-0095

DRAFT FINAL TECHNICAL PLAN ADDENDUM
JULY 1990

SURFACE WATER FY90

Section II Addendum

3818

R.L. STOLLAR & ASSOCIATES, INC.

Harding Lawson Associates
Ebasco Services Incorporated
DataChem, Inc.
Enseco-Cal Lab
Midwest Research Institute

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COMPREHENSIVE MONITORING PROGRAM

Contract Number DAAA15-87-0095

**DRAFT FINAL TECHNICAL PLAN ADDENDUM
JULY 1990**

SURFACE WATER FY90

Section 11 Addendum

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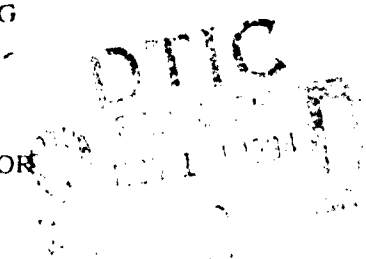


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ROCKY MOUNTAIN ARSENAL**



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**Rocky Mountain Arsenal
Information Center
Commerce City, Colorado**

TABLE OF CONTENTS

	PAGE
11.0 ADDENDUM	1
11.1 Water Quantity	1
11.1.1 Revised Location of Surface-Water Monitoring Stations	1
11.1.2 Revised Surface-Water Data Acquisition	3
11.1.3 Revised Surface-Water Monitoring Station Maintenance	3
11.2 Water Quality	7
11.2.1 Revised Surface-Water Quality Monitoring Network	7
11.2.2 Revised Surface-Water Quality Monitoring Strategies	7
11.3 Sediment Transport	11
11.3.1 Revised Sediment Quantity	11
11.4 Revised Laboratory Analysis Program	11

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LIST OF PLATES
(in pocket)

- 2.2-1 Surface-Water Quantity Monitoring Station
- 2.2-2 Surface-Water Quantity Sampling Locations

LIST OF TABLES

- 11.1-1 CMP Monitoring Equipment, July 1990
- 11.1-1 Surface-Water Monitoring Station Activities
- 11.2-1 Surface-Water Quality Sampling Frequency
- 11.2-2 Potential Locations for Additional Annual Event and Storm Event Samples
- 11.4-1 Analytical Methods for Surface-Water Quality and Sediment Samples

LIST OF FIGURES

- 11.1-1 Location of Basin F Gaging Station

11.0 ADDENDUM

Several modifications were made to the surface-water monitoring network during Water Year 1989. These changes to the surface-water element of the CMP are discussed in this section.

11.1 Water Quantity

11.1.1 Revised Location of Surface-Water Monitoring Stations

During late September 1988, flow at the South First Creek station in Section 5 was disrupted with the repair of the Sixth Avenue road and construction of a retention pond upstream of the station. A new station was constructed by Stollar in October 1988 and is located in the northeast portion of Section 8, upstream of the retention pond construction area. The new station was equipped with a concrete V-notch weir, staff gage, Stevens Type F recorder and corrugated metal pipe stilling well. During April 1989 the station was also equipped with a CR-10 data logger/bubbler system, which is housed in a wooden storage shed with a nitrogen supply tank. Stage data collection was reinitiated at this time.

Construction activities in Section 24 and the subsequent widening of First Creek, prompted the relocation of the North First Creek monitoring station to a more suitable upstream location. Construction of a new North First Creek monitoring station was performed by Stollar and was completed in March 1989. The station is equipped with a concrete V-notch weir, staff gage, Stevens Type F recorder, corrugated metal pipe stilling well and CR-10 data logger/bubbler system. A wooden storage shed houses the CR-10 along with a nitrogen supply tank. Stage data collection began in April 1989.

The First Creek Off-Post monitoring station was redesigned and reconstructed in June 1989. The station is equipped with a concrete triangular flume, Stevens Type F recorder, DP-115 datapod recorder with a potentiometer, staff gage and a corrugated metal pipe stilling well that also serves as the gage house. Stage data collection began in July 1989.

A new monitoring station was installed in the Basin F area (Figure 11.1-1) in order to satisfy the Basin F Interim Response Action requirements for surface-water monitoring. The station consists of a 200 mm long-throated flume, Stevens Type F recorder, DP-115 datapod recorder with a potentiometer and a corrugated metal pipe stilling well. Stage data collection was initiated in November 1989.

22

23

Ninth Avenue

27

C Street

Pond A

Pond B

Basin F
Liquid
Holding
TanksGaging
Station and
Sampling SiteLeachate
Collection Pond

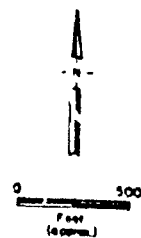
Waste Pile

Former Basin F
Outline

26

Legend

--- Drainage
 ■ Gaging Station and
 Sampling Location SW26001

Prepared for

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Figure 11-1

Location of Basin F
 Gaging Station (SW26001)

Five surface-water stations (North Uvalda, Ladora Weir, Peoria Interceptor, Havana Pond and Basin A) were equipped with Omnidata International, Inc. model DP115 datapod digital recorders during FY89. The datapod is coupled to a Stevens Type F recorder with a 10-turn potentiometer that receives electrical current from the datapod's battery power source. Movement of the Stevens recorder's drum varies the resistance of the 10-turn potentiometer and is recorded by the datapod. These data are in a digital format and are checked for continuity with the analog record produced by the Stevens recorder. The datapod records date, time and corresponding gage height on a nonvolatile solid state memory data storage module (DSM). The DSM is removed monthly and along with a strip chart and data is reduced to gage height for each station. All stations are still visited weekly to check stage and perform any maintenance.

11.1.2 Revised Surface-Water Data Acquisition

In addition to the Telodyne-Gurley Pygmy current meter and the Price Type AA current meter, several other types of instantaneous discharge measuring equipment are used in the surface-water program. A portable, 200 mm long-throated flume was put into use during April 1989 and is used extensively for low end instantaneous discharge measurements for the range of 0.0367 cfs to 1.762 cfs. A smaller, 100 mm long-throated flume was put into service in June 1989 and is used to obtain instantaneous discharge measurements for very low flows in the range of 0.0078 cfs to 0.3099 cfs. Additionally, a Marsh-McBirney Model 201 current meter is used as a backup to the Pygmy and Type AA current meters. Table 11.1-1 lists the surface-water monitoring equipment used for the Surface-Water CMP.

Surface-water monitoring activities were altered slightly at some stations and these changes are reflected in Table 11.1-2 (Table 3.1-2 revised).

11.1.3 Revised Surface-Water Monitoring Station Maintenance

Five surface-water stations are equipped with Campbell Scientific CR-10 data logger/bubbler systems in order to obtain reliable stage data during the freezing months. Stations equipped with the CR-10 data logger/bubbler system include North First Creek, South First Creek, South Uvalda, Peoria Interceptor, and Havana Interceptor.

The CR-10 data logger/bubbler system operates on the principle whereby nitrogen is fed through a tube to an orifice that escapes into the stream. A transducer senses the pressure in the tube which corresponds to the hydrostatic head above the tube orifice. The data logger records the pressure data, calculates gage height, temperature, battery voltage, and calibration data at 15

Table 11.1-1 CMP Monitoring Equipment, July 1990

Quantity	Equipment List
12	Stevens Type F water level recorder, Model 68 with quartz multispeed timer
5	Campbell Scientific CR-10 data logger/bubbler system
6	Omnidata International, Inc. model DP115 datapod, equipped with a 10-turn potentiometer
2	Teledyne - Gurley Pygmy current meter
1	Price Type - AA current meter
1	200 mm, portable, long-throated flume
1	100 mm, portable, long-throated flume

Table 11.1-2 (Table 3.2-1 revised) Surface-Water Monitoring Station Activities

Station	Type	Activity		
		Weekly	Monthly	Storm Event
<u>Irondale Guich Drainage Basin</u>				
Havana Interceptor (SW11002)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	Discharge Measurement/ Monitor Crest Gage
Peoria Interceptor (SW1101)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	Monitor Crest Gage
Ladora Weir (SW02001)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement/ When Flow Occurs	
South Uvalda (SW12005)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement/ When Flow Occurs	Discharge Measurement/ Monitor Crest Gage
North Uvalda (SW01001)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	
Highline Lateral (SW12007)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement/ When Flow Occurs	
South Plains Ditch (SW01003)	Recording Station	Service Recorders & Monitor Staff Gage		Discharge Measurement/ Monitor Crest Stage
Havana Pond (SW11003)	Recording Station	Service Recorders & Monitor Staff Gage		
Upper Derby Lake (SW01004)	Staff Gage	Monitor Staff Gage	Monitor Gage	Monitor Gage
Lower Derby Lake (SW01005)	Staff Gage	Monitor Staff Gage	Monitor Gage	Monitor Gage

Table 11.1-2 (Table 3.2-1 revised) Surface-Water Monitoring Station Activities (continued)

Station	Type	Activity		
		Weekly	Monthly	Storm Event
<u>Irondale Gulch Drainage Basin (continued)</u>				
Ladora Lake (SW02003)	Staff Gage	Monitor Staff Gage	Monitor Gage	Monitor Gage
Lake Mary (SW02004)	Staff Gage	Monitor Staff Gage	Monitor Gage	Monitor Gage
<u>First Creek Drainage Basin</u>				
South First Creek (SW08003)	Recording Station	Service Recorders	Discharge Measurement	Discharge Measurement/ Monitor Crest Gage
North First Creek (SW24002)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	Discharge Measurement/ Monitor Crest Gage
First Creek Off-post (SW37001)	Recording Station	Out of Service All Year	Discharge Measurement Monitor Crest Stage	Discharge Measurement/
Sewage Treatment Plant (SW24001)	Flow Meter	Monitor Meter		
<u>South Platte Drainage</u>				
Basin F (SW26001)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	Discharge Measurement/ Monitor Crest Stage
Basin A (SW36001)	Recording Station	Service Recorders & Monitor Staff Gage	Discharge Measurement	Discharge Measurement/ Monitor Crest Stage

minute intervals on a 720K RAM pack storage module. Data from the storage modules are then downloaded to a compatible PC for reduction.

11.2 Water Quality

11.2.1 Revised Surface-Water Quality Monitoring Network

The surface-water quality monitoring network has undergone some modifications. The stations at North First Creek and South First Creek have been moved upstream of their original locations. The relocations were necessitated due to construction near the original stations on First Creek. A surface-water monitoring station was added to the network during October 1989 in the Basin F drainage area to monitor the water quality and quantity of surface runoff in this area. The Basin F surface-water monitoring station is located in NW $\frac{1}{4}$, SW $\frac{1}{4}$, Section 26 approximately 1000 ft east of C Street and 1300 ft south of Ninth Avenue. Sampling frequency will be controlled by surface-water runoff that is expected only during high event periods such as snow melt or rainfall.

11.2.2 Revised Surface-Water Quality Monitoring Strategies

Table 11.2-1 (Table 3.3-2 revised) and Table 11.2-2 (Table 3.3-3 revised) summarizes the frequency and location at which water quality samples will be collected during the annual, fall, spring and storm event sampling rounds for the CMP surface-water program. It should be noted, however, that intermittent flow conditions may prevent the acquisition of seasonal water quality samples during any given sampling round. Additionally, the magnitude of a high event required to produce flow at some stations may not occur during the entire year, thus limiting storm sample collection at some sites.

Since acquiring storm samples during rising stage is often difficult due to response time, two Isco Model 2700 autosamplers are used at surface-water monitoring stations to supplement the CMP storm sampling activities. The Isco samplers must operate in conjunction with CR-10 data logger/bubbler systems. During a high event when rising stream stage reaches a specified depth over the CR-10's bubbler line, the Isco sampler is then triggered and collects a water sample via a peristaltic pump.

Table 11.2-1 (Table 3.3-2 revised)
Surface-Water Quality Sampling Frequency

Station	Frequency	Parameters	Number of Samples	
			Target	GC/MS
SW11002 Havana Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW11001 Peoria Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW12005 S. Uvalda Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW37001 First Creek Off-Post	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
SW08003 S. First Creek (Replaces SW05001)	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW24002 N. First Creek	Spring & Fall 2 storm events	Target & GC/MS	4	4
			24	20
SW01003 South Plants Ditch	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
SW01001 N. Uvalda Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	-
SW36001 Basin A	Spring & Fall 2 storm events	Target & 10% GC/MS	4	4
SW26001 Basin F	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
			16	4
SW12007 Highline Lateral (Replaces SW07003)	Annual (Spring)	Target & 10% GC/MS	1	-
SW01004 Upper Derby Lake	Annual (Spring)	Target & 10% GC/MS	1	-
SW01005 Lower Derby Lake	Annual (Spring)	Target & 10% GC/MS	1	-
SW02001 Ladora Weir	Annual (Spring)	Target & 10% GC/MS	1	-
SW02003 Ladora Lake	Annual (Spring)	Target & 10% GC/MS	1	-

Table 11.2-1 Surface-Water Quality Sampling Frequency (continued)

Station	Frequency	Parameters	<u>Number of Samples</u>	
			Target	GC/MS
SW02004 Lake Mary	Annual (Spring)	Target & 10% GC/MS	1	-
SW02006 South Plants Steam Effluent	Annual (Spring)	Target & 10% GC/MS	1	-
SW24001 Sewage Treatment Effluent	Annual (Spring)	Target & 10% GC/MS	1	-
SW01002 South Plants Water Tower	Annual (Spring)	Target & 10% GC/MS	1	-
SW02002 Sand Creek Lateral East	Annual (Spring)	Target & 10% GC/MS	1	-
SW02005 Sand Creek Lateral West	Annual (Spring)	Target & 10% GC/MS	1	-
SW11003 Havana Pond	Annual (Spring)	Target & 10% GC/MS	1	-
SW12003 Rod and Gun Club Pond	Annual (Spring)	Target & 10% GC/MS	1	-
SW24003 North Bog	Annual (Spring)	Target & 10% GC/MS	$\frac{1}{14}$	$\frac{-}{2}$
12 Additional Samples See Table 11.2-2 (Table 3.3-3 revised)	Annual (Storm Event)	Target & 10% GC/MS	12	2
Totals			66	28

11.3 Sediment Transport

11.3.1 Revised Sediment Quantity

Bedload and suspended sediment sampling is conducted at RMA during the spring and fall surface-water sampling rounds. Suspended sediment samples are also collected during storm events and during the three gain/loss studies conducted along First Creek.

Samples for both bedload and suspended sediments are acquired using the sample container; however, during gain/loss studies, suspended sediments are collected using a hand held DH-48 depth integrating sampler. Bedload samples are collected in amber, widemouth glass jars.

11.4 Revised Laboratory Analysis Program

DataChem and ESE Laboratories were utilized for the analysis of water and sediment samples. The same analytical techniques and reporting limits were used by both laboratories. Target analytes and GC/MS analysis of water samples is performed by DataChem, Inc. ESE Laboratories is responsible for both target analytes and GC/MS analysis of sediment samples. A revised summary of parameters, laboratory methods and reporting limits employed in the analysis of surface-water and sediment quality are listed in Table 11.4-1 (Table 3.3-1 revised).

Table 11.4-1 (Table 3.3-1 revised) Analytical Methods for Surface-Water Quality and Sediment Samples

Analyte Suite	Parameters	Method Lab.*	Water ($\mu\text{g/l}$)		Method** Lab. Number	Soil ($\mu\text{g/g}$)	
			Reporting Limits (min.)	(max.)		Reporting Limits (min.)	(max.)
Volatile Aromatics	Benzene	DC, ESE	AV8	1.05	40.2	DC, ESE	AA9
	Toluene			1.47	39.7		
	Chlorobenzene			1.39	39.8		
	Ethyl benzene			1.37	39.7		
	1,3-Xylene			1.32	39.9		
	1,2-Xylene			1.36	39.6		
Volatile Halocarbons	1,1-Dichloroethene	DC, ESE	N8	1.70	200	DC, ESE	NN9
	1,1-Dichloroethane			0.73	200		
	1,2-Dichloroethene			0.76	200		
	Chloroform			0.50	200		
	1,2-Dichloroethane			1.10	200		
	1,1,1-Trichloroethane			0.760	200		
	Carbon Tetrachloride			0.930	200		
	1,1,2-Trichloroethane			0.780	200		
	Tetrachloroethane			0.750	200		
	Chlorobenzene			0.750	200		
	Methylene Chloride			7.40	200		
DBCP	1,2-Dibromo-3-chloropropane	DC, ESE	AY8	0.195	10	DC, ESE	S9
Organosulfur Compounds	Dimethyldisulfide	DC, ESE	AAA8	0.55	15	DC, ESE	HH9A
	1,4-Oxathiane			2.38	25		
	1,4-Dithiane			1.34	25		
	Benzothiazole			5.00	50		
	P-Chlorophenylmethyl sulfide			5.69	50		
	P-Chlorophenylmethyl sulfoxide			11.5	75		
	P-Chlorophenylmethyl sulfone			7.46	100		

* Laboratory

DC = DataChem Laboratory

ESE = Environmental Science Engineering

Table 11.4-1 (Table 3.2-2 revised) Analytical Methods for Surface-Water Quality and Sediment Samples (continued)

Analyte Suite	Parameters	Method		Water ($\mu\text{g/l}$)		Soil ($\mu\text{g/g}$)	
		Lab.*	Method Number	Reporting Limits (min.)	Reporting Limits (max.)	Method**	Reporting Limits (max.)
Organochlorine Pesticide	Hexachlorocyclopentadiene	DC, ESE	KK8	0.048	0.99	DC, ESE KK9B	0.0014
	Aldrin			0.050	1.00		0.0021
	Isodrin			0.051	1.10		0.0019
	PPDDE			0.054	1.0		0.0047
	Dieldrin			0.050	1.0		0.0018
	Endrin			0.050	1.0		0.0047
	PPDDT			0.049	1.0		0.0028
Hydrocarbons	Chlordane			0.095	1.0		0.023
	Bicycloheptadiene	DC, ESE	P8	5.90	104.2	DC, ESE PP9	1.10
	Dicyclopentadiene			5.00	99.6		0.45
Anions	Methylisobutyl ketone			4.90	98.0		0.64
	Bromide	DC, ESE	HH8A	-	-	DC, ESE HHH9	14.00
	Chloride			716.0	10,000		-
	Fluoride			480.0	5,000		200
Nitrate	Sulfate			250.0	10,000		10.00
							88.00
Nitrate	Nitrate	DC, ESE	LL8	10.0	200	-	-
Arsenic	Arsenic	DC, ESE	CC8	0.1	2.0	DC, ESE Y9	2.5
Mercury	Mercury	DC, ESE	CC8	0.1	2.0	DC, ESE Y9	0.05
ICP Metals	Cadmium	DC, ESE	SS12	6.8	12,500	DC, ESE P9	0.74
	Chromium			16.8	1,000		6.5
	Copper			18.8	10,000		4.7
	Lead			43.4	10,000		8.4
	Zinc			18.0	10,000		8.7

* Laboratory

DC = DataChem Laboratory

ESE = Environmental Science Engineering

ADDEN-TB. SW

Table 11.4-1 (Table 3.2-2 revised) Analytical Methods for Surface-Water Quality and Sediment Samples (continued)

Analyte Suite	Parameters	Method Lab.* Number	Water ($\mu\text{g/l}$)		Method** Lab. Number	Soil ($\mu\text{g/g}$)	
			Reporting Limits (min.)	(max.)		Reporting Limits (min.)	(max.)
Volatiles	Magnesium		135.0	100,000		-	-
	Calcium		105.0	100,000		-	-
	Sodium		279.0	100,000		-	-
	Potassium		240.0	10,000		-	-
	1,1,1-Trichloroethane	DC, ESE	1.0	100	DC, ESE UM23	0.43	10.0
	1,1,2-Trichloroethane	UM21	1.0	100		0.39	25.0
	1,1-Dichloroethane		1.0	150		1.7	25.0
	1,1-Dichloroethene		1.0	150		-	-
	1,2-Dichloroethane		1.0	150		0.56	5.0
	1,2-Dichloroethene		5.0	150		-	-
	Benzene		1.0	150		0.25	25.0
	Carbon tetrachloride		1.0	150		0.25	10.0
	Chlorobenzene		1.0	150		1.5	10.0
	Chloroform		1.0	150		0.29	5.0
	Methylene Chloride		1.0	150		1.5	25.0
	Tetrachloroethene		1.0	150		0.25	25.0
	Toluene		1.0	150		0.25	25.0
	Trichloroethene		1.0	150		0.54	25.0
	1,3-Dimethylbenzene		1.0	150		0.74	10.0
	Xylene		2.0	300		4.9	50.0
	Methylisobutyl ketone		1.4	100		0.73	25.0
Semi-volatiles	Aldrin	DC, ESE	13.0	300	DC, ESE L9	0.30	25.0
	Atrazine	UM25	5.9	300		0.30	99.5
	Hexachlorocyclopentadiene		54.0	300		0.60	25.1
	Chlordane		37.4	300		2.0	25.1
	p-Chlorophenylmethyl sulfide		10.0	300		0.90	99.5
	p-Chlorophenylmethyl sulfoxide		5.2	300		0.30	99.5
	p-Chlorophenylmethyl sulfone		15.0	300		0.30	99.5

* Laboratory

DC = DataChem Laboratory

ESE = Environmental Science Engineering

ADDEN-18.5W

Table 11.4-1 (Table 3.2-2 revised) Analytical Methods for Surface-Water Quality and Sediment Samples (continued)

Analyte Suite	Parameters	Lab.*	Method Number	Water ($\mu\text{g/l}$)		Method**	Soil ($\mu\text{g/g}$)	
				Reporting Limits (min.)	Reporting Limits (max.)		Reporting Limits (min.)	Reporting Limits (max.)
Cyanide Nitrogen/ Phosphate Pesticides	Dibromochloropropane			12.0	300		0.30	99.5
	Dicyclopentadiene			5.5	300		1.0	50.0
	Vapona			8.5	300		3.0	99.5
	Diisopropylmethyl phosphonate			21.0	200		1.0	99.5
	Dithiane			3.3	100		0.40	99.5
	Dieldrin			26.0	100		0.30	99.5
	Dimethylmethyl phosphonate			130.0	200		-	-
	Endrin			18.0	200		0.50	25.10
	Isodrin			7.8	300		0.30	25.1
	Malathion			21.0	300		0.70	25.1
	Oxathiane			27.0	300		0.30	99.5
	PPDDE			14.0	300		0.60	50.0
	PDDT			18.0	100		0.47	25.1
	Parathion			37.0	300		0.90	25.1
	Cyanide	DC, ESE	TF20	5.0	200			
	Atrazine	DC, ESE	UH11	4.03	100			
	Parathion			0.647	50			
	Malathion			0.500	50			
	Supona			0.787	50			
	Vapona			0.500	50			

* Laboratory

** Description of Method Number in Section 3.2.4

DC= DataChem Laboratory

ESE = Environmental Science Engineering

Table 11.2-1 (Table 3.3-2 revised)
Surface-Water Quality Sampling Frequency

Station	Frequency	Parameters	Number of Samples	
			Target	GC/MS
SW11002 Havana Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW11001 Peoria Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW12005 S. Uvalda Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW37001 First Creek Off-Post	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
SW08003 S. First Creek (Replaces SW05001)	Spring & Fall 2 storm events	Target & GC/MS	4	4
SW24002 N. First Creek	Spring & Fall 2 storm events	Target & GC/MS	4	4
			24	20
SW01003 South Plants Ditch	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
SW01001 N. Uvalda Interceptor	Spring & Fall 2 storm events	Target & GC/MS	4	-
SW36001 Basin A	Spring & Fall 2 storm events	Target & 10% GC/MS	4	4
SW26001 Basin F	Spring & Fall 2 storm events	Target & 10% GC/MS	4	-
			16	4
SW12007 Highline Lateral (Replaces SW07003)	Annual (Spring)	Target & 10% GC/MS	1	-
SW01004 Upper Derby Lake	Annual (Spring)	Target & 10% GC/MS	1	-
SW01005 Lower Derby Lake	Annual (Spring)	Target & 10% GC/MS	1	-
SW02001 Ladora Weir	Annual (Spring)	Target & 10% GC/MS	1	-
SW02003 Ladora Lake	Annual (Spring)	Target & 10% GC/MS	1	-

Table 11.2-1 Surface-Water Quality Sampling Frequency (continued)

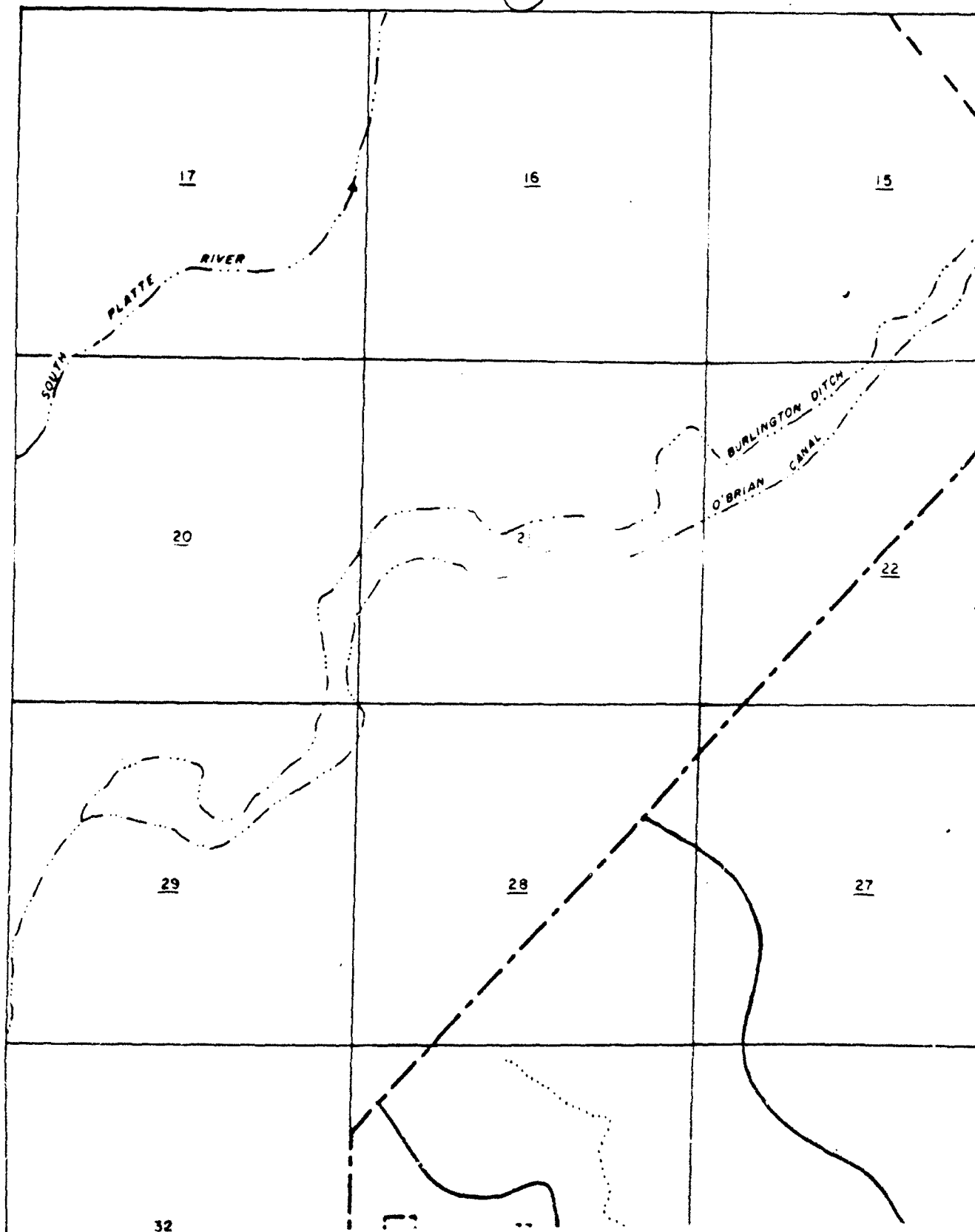
Station	Frequency	Parameters	<u>Number of Samples</u>	
			Target	GC/MS
SW02004 Lake Mary	Annual (Spring)	Target & 10% GC/MS	1	-
SW02006 South Plants Steam Effluent	Annual (Spring)	Target & 10% GC/MS	1	-
SW24001 Sewage Treatment Effluent	Annual (Spring)	Target & 10% GC/MS	1	-
SW01002 South Plants Water Tower	Annual (Spring)	Target & 10% GC/MS	1	-
SW02002 Sand Creek Lateral East	Annual (Spring)	Target & 10% GC/MS	1	-
SW02005 Sand Creek Lateral West	Annual (Spring)	Target & 10% GC/MS	1	-
SW11003 Havana Pond	Annual (Spring)	Target & 10% GC/MS	1	-
SW12003 Rod and Gun Club Pond	Annual (Spring)	Target & 10% GC/MS	1	-
SW24003 North Bog	Annual (Spring)	Target & 10% GC/MS	$\frac{1}{14}$	$\frac{-}{2}$
12 Additional Samples See Table 11.2-2 (Table 3.3-3 revised)	Annual (Storm Event)	Target & 10% GC/MS	12	2
Totals			66	28

Table 11.2-2 (Table 3.3-3 revised)
Potential Locations for Additional Annual Event and Storm Event Samples

Station Number	Location Name
SW04001	Motor Pool
SW07001	Uvalda Ditch A
SW07002	Uvalda Ditch B
SW08001	South First Creek East Boundary
SW12001	Uvalda Ditch C
SW12002	Uvalda Ditch D
SW12004	Storm Sewer
SW24004	First Creek North Boundary
SW30001	North Plants
SW30002	First Creek near North Plants
SW31001	First Creek Toxic Storage Yard A
SW31002	First Creek Toxic Storage Yard B

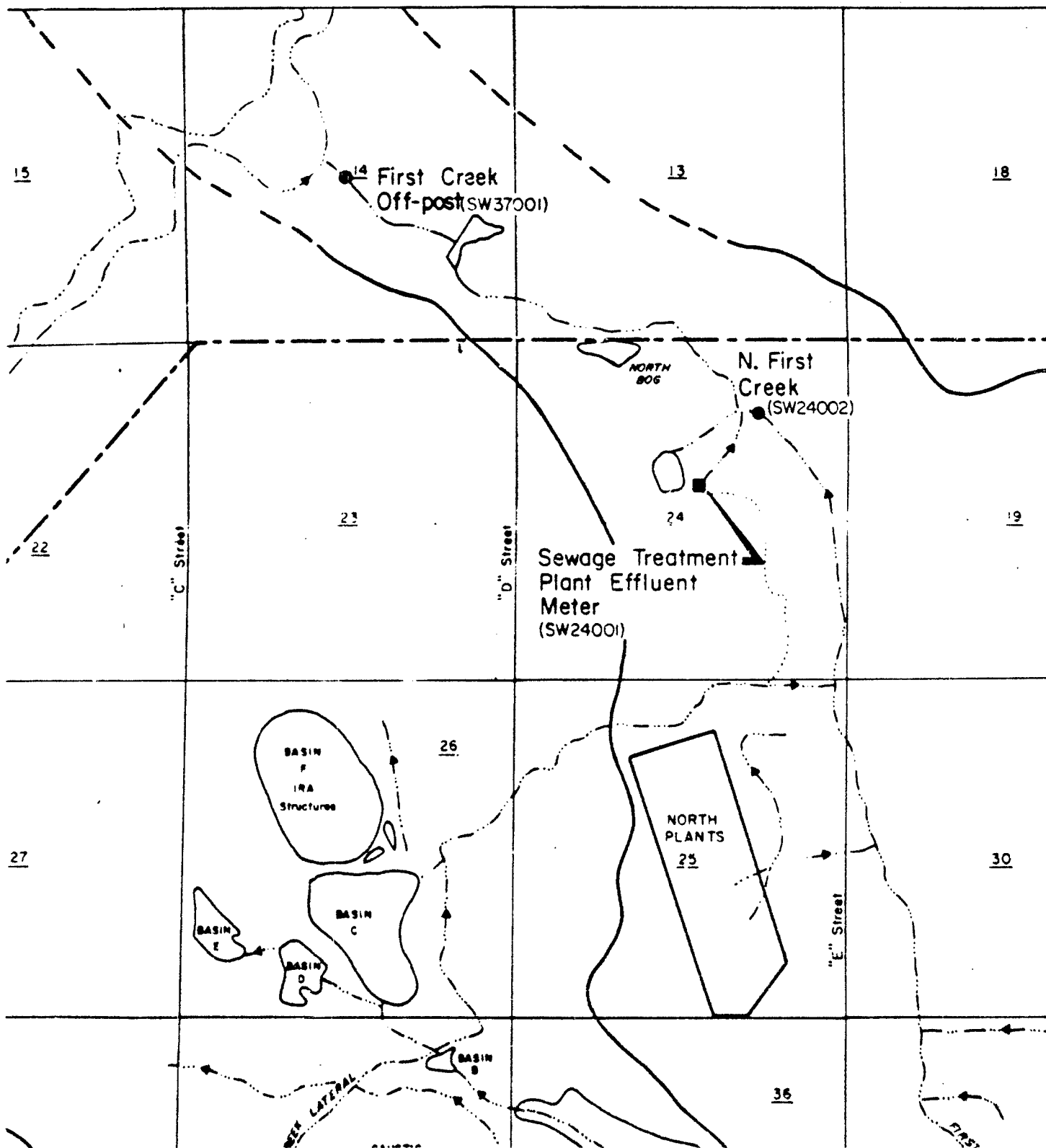
Table 11.1-1 CMP Monitoring Equipment, July 1990

Quantity	Equipment List
12	Stevens Type F water level recorder, Model 68 with quartz multispeed timer
5	Campbell Scientific CR-10 data logger/bubbler system
6	Omnidata International, Inc. model DP115 datapod, equipped with a 10-turn potentiometer
2	Teledyne - Gurley Pygmy current meter
1	Price Type - AA current meter
1	200 mm, portable, long-throated flume
1	100 mm, portable, long-throated flume



⑤

2



Legend

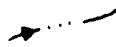
4

20

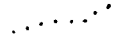
Section Number



Lake, Pond or Basin



Stream or Ditch with
Flow Direction



Abandoned Stream or Ditch



Water Level Recording
Station Locations
(SW37001) Corresponding
Sampling Identification
Number



Staff Gage Locations



Flow Meter Locations



Arsenal Boundary



Drainage Basin Boundary

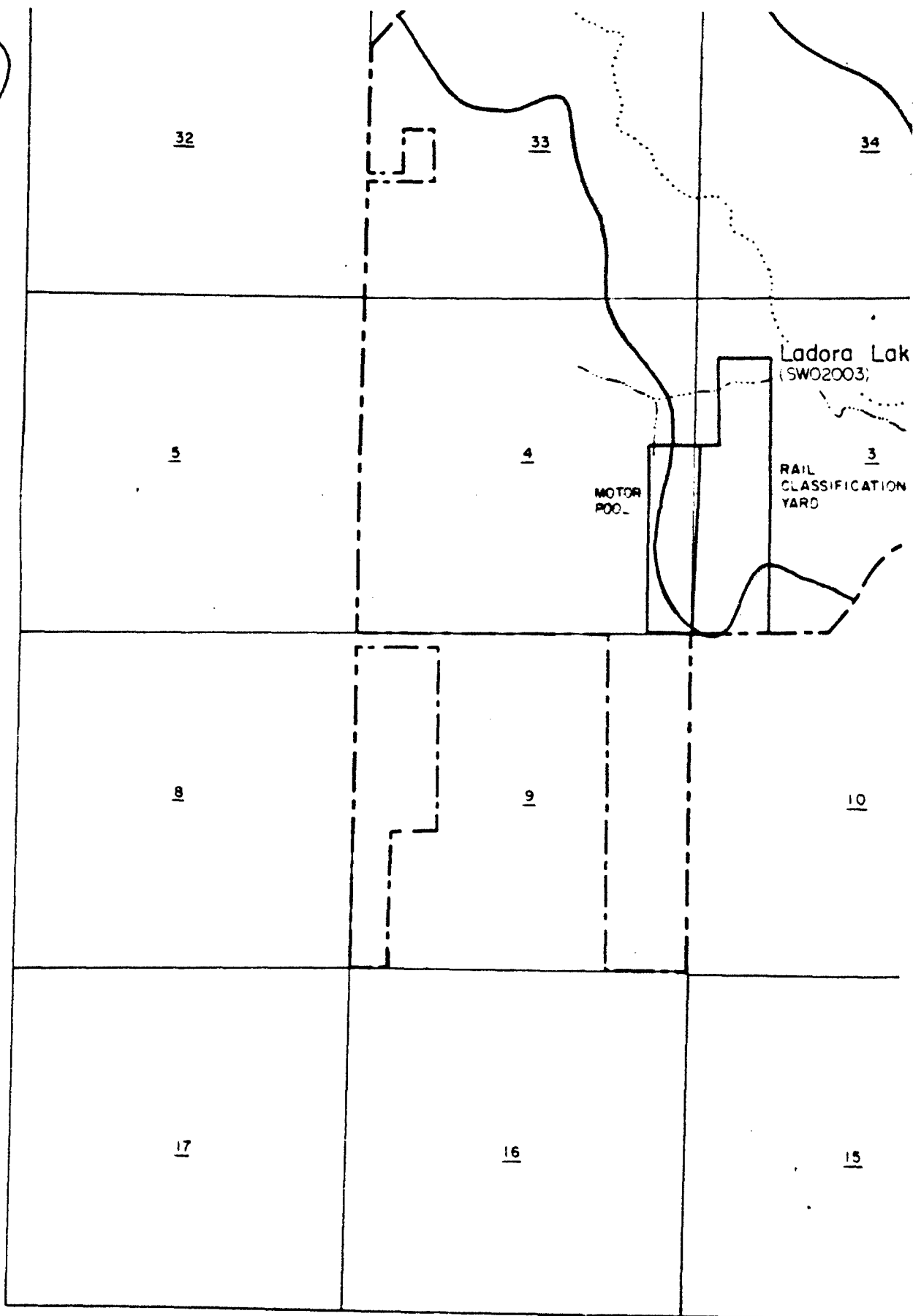
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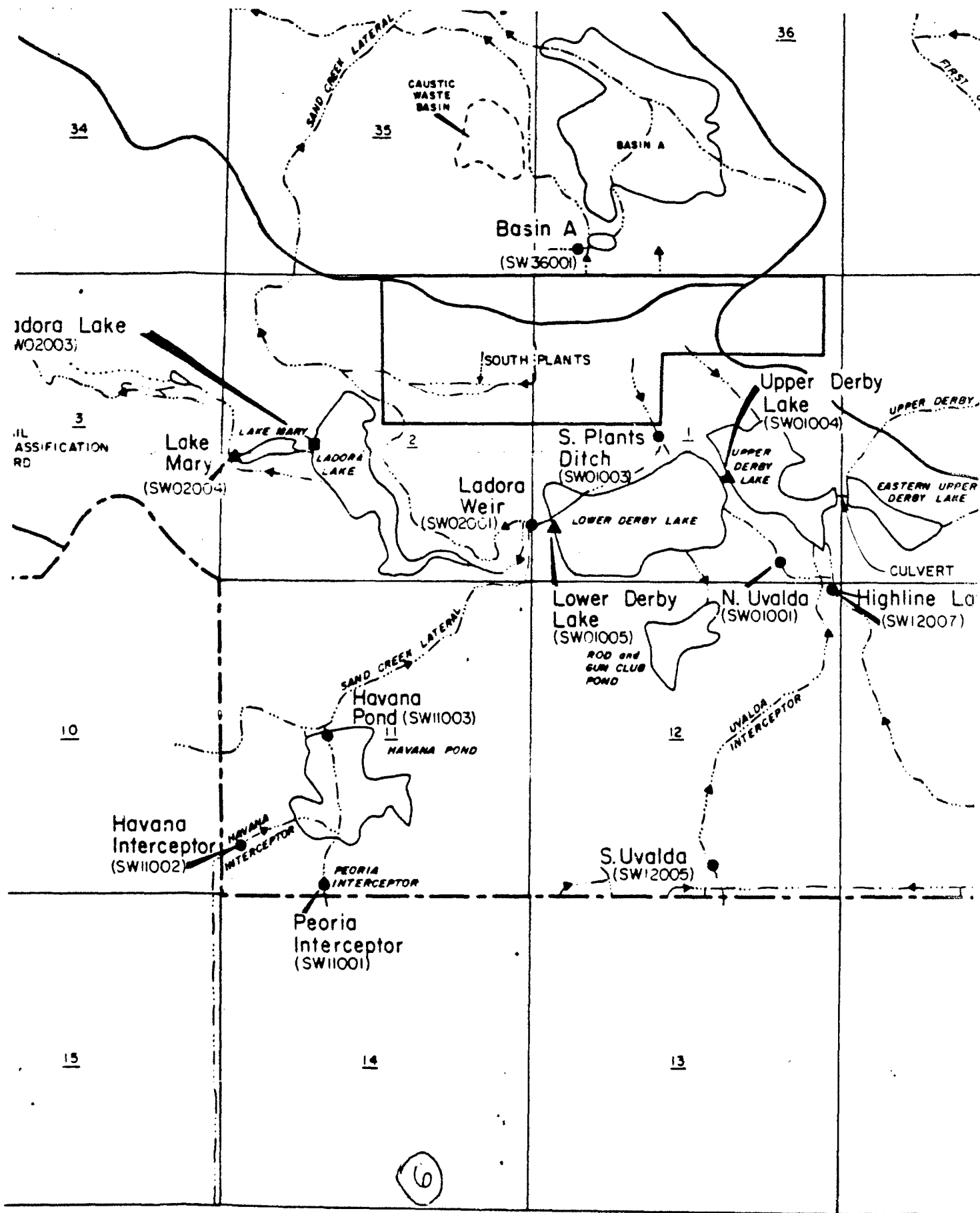
21

28

8

5





7

32

33

December Seventh Avenue

Derby

004

6

5

4

UPPER DERBY LAKE OVERFLOW

EASTERN UPPER DERBY LAKE

CULVERT

Sixth Avenue

Old
S. First
Creek
(SW05001)

New
S. First
Creek
(SW08003)

7

8

9

HIGHLINE LATERAL

18

17

16

Highline Lateral
(SW12007)

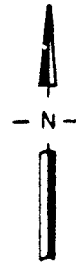
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4

9

16

8



0 2000 4000
FEET

Prepared for :

U.S. Army Program Manager for
Rocky Mountain Arsenal
Commerce City, Colorado

Prepared by :

R.L. Stollar & Associates, Inc.
Harding Lawson Associates

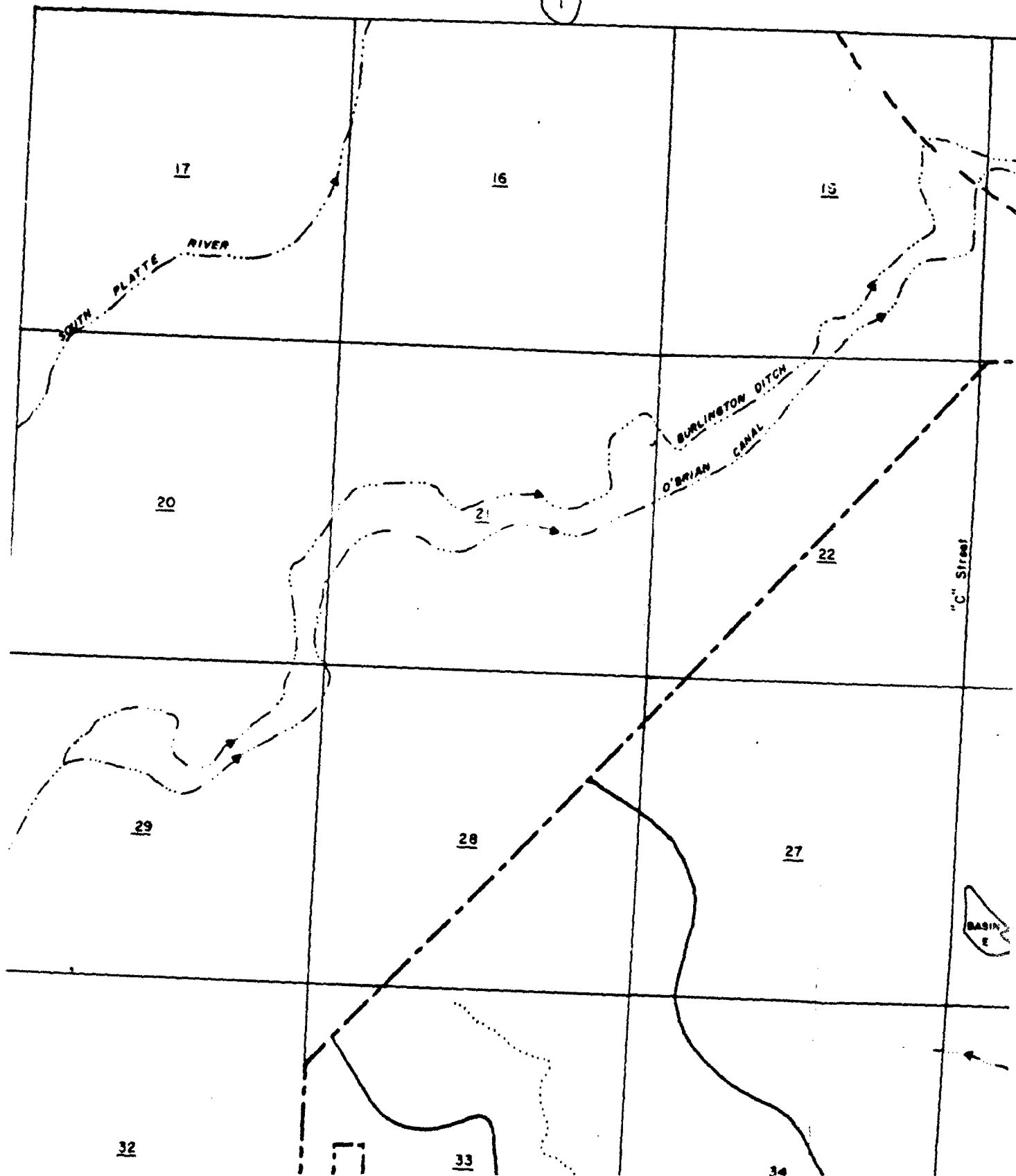
Plate 2.2-1

Surface-Water Quantity Monitoring
Station Locations

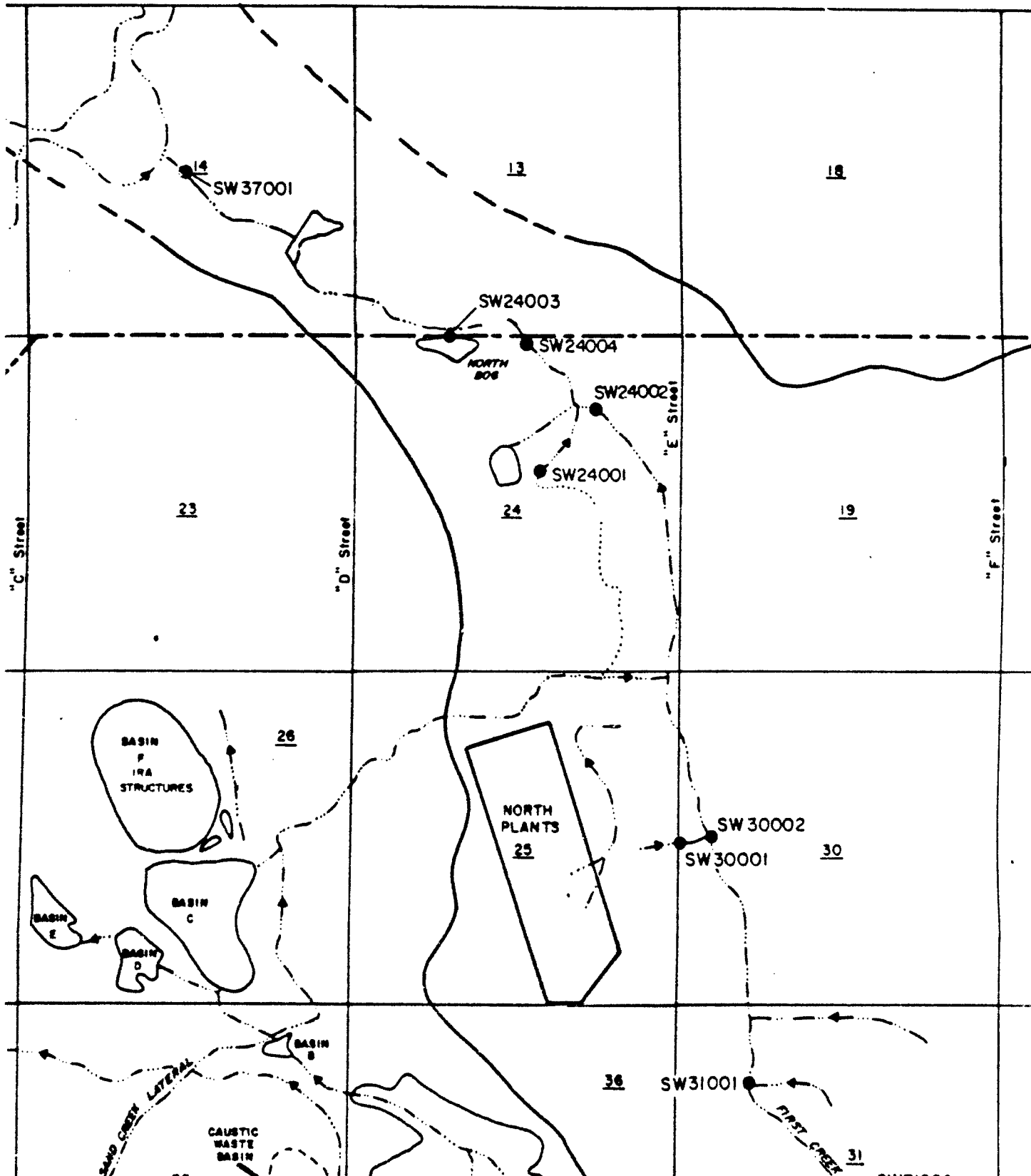
9

CMP Surface-Water Technical Plan FY90

①



2



(3)

(4)

20

17

16

SECOND
CREEK

20

21

"F" Street

Ninth Avenue

22

23

Eighth Avenue

SW

(8)

(4)

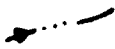
Legend

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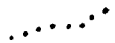
Section Number



Lake, Pond or Basin



Stream or Ditch with
Flow Direction



Abandoned Stream or Ditch

● SW24001

Surface Water Sample
Location

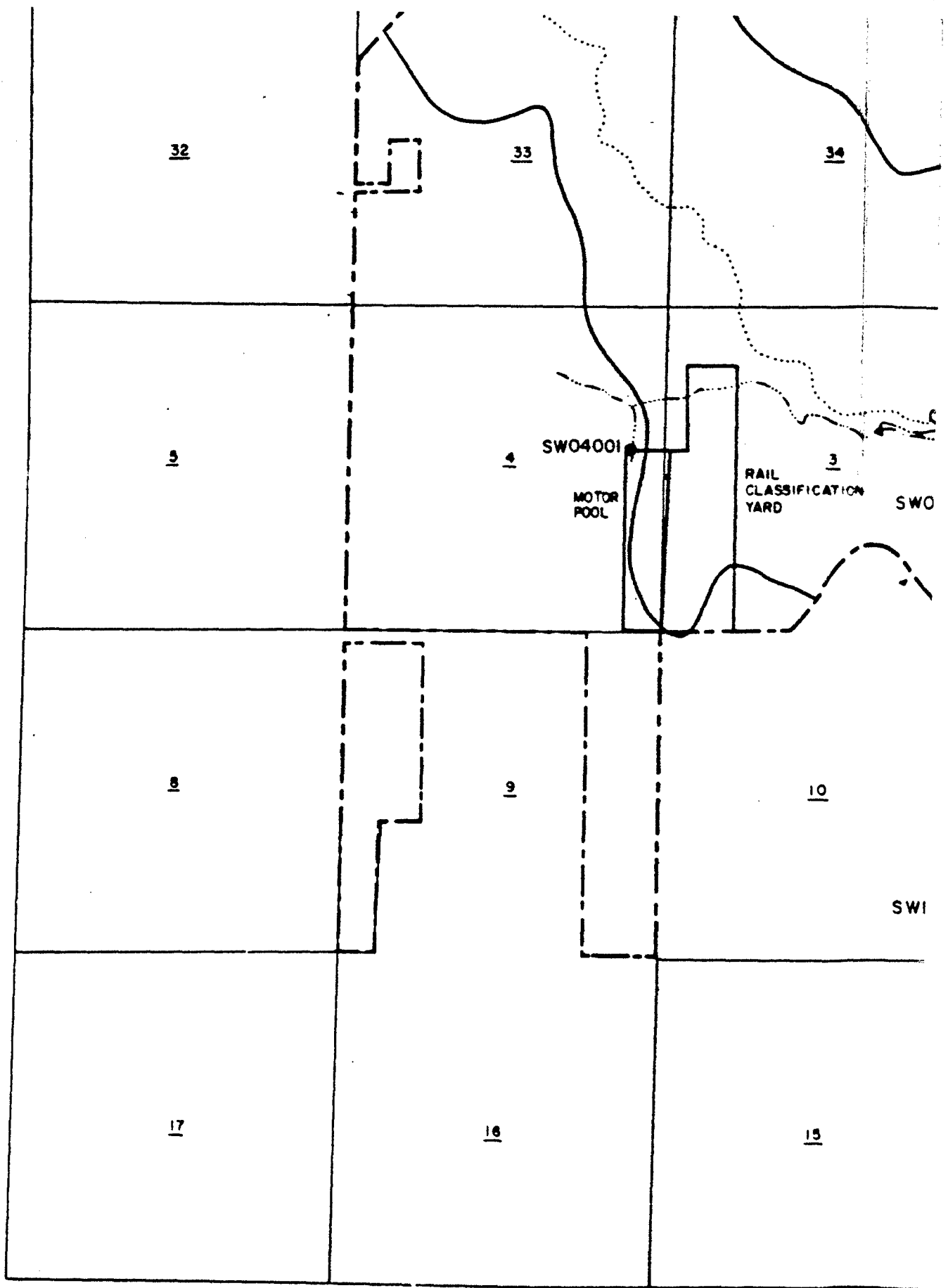


Arsenal Boundary

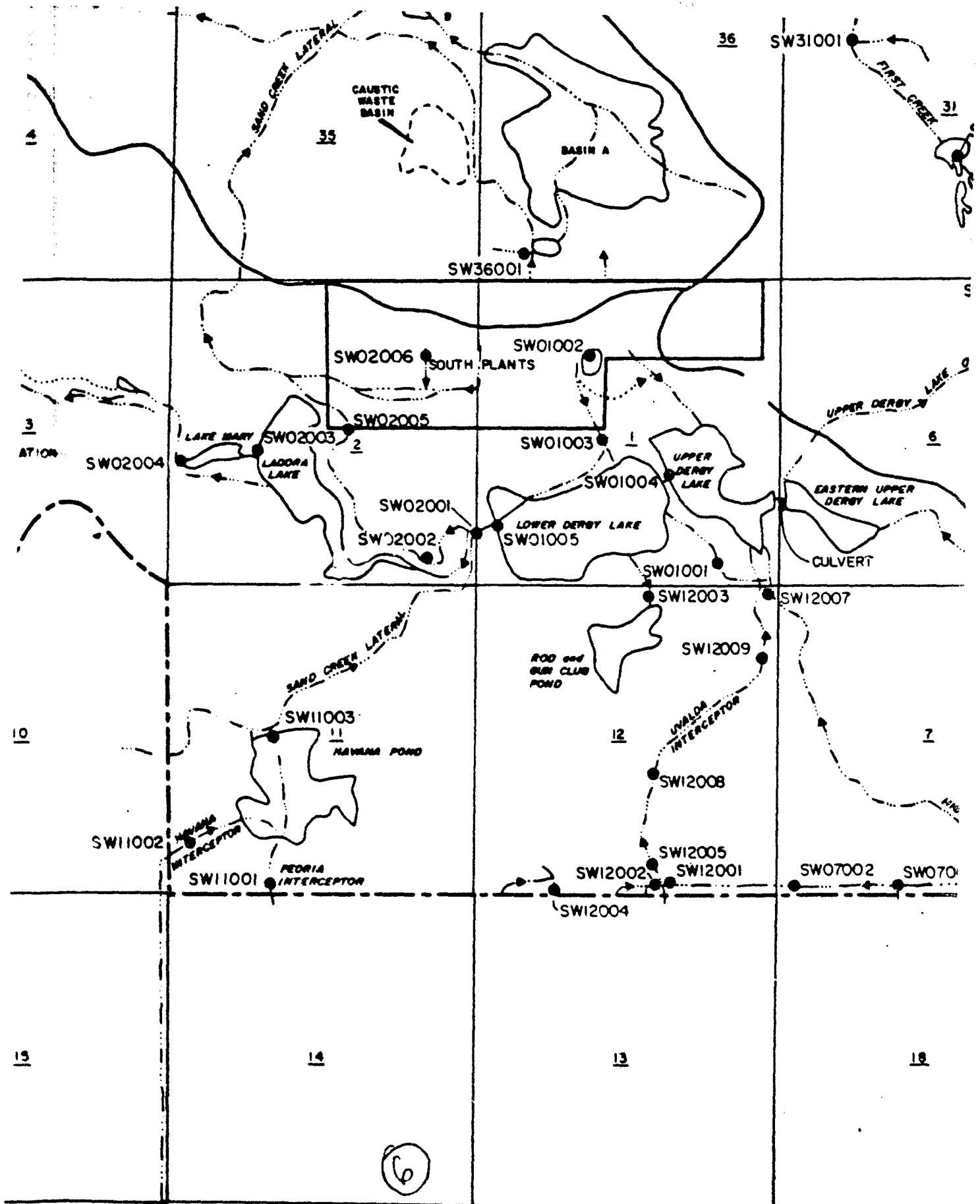


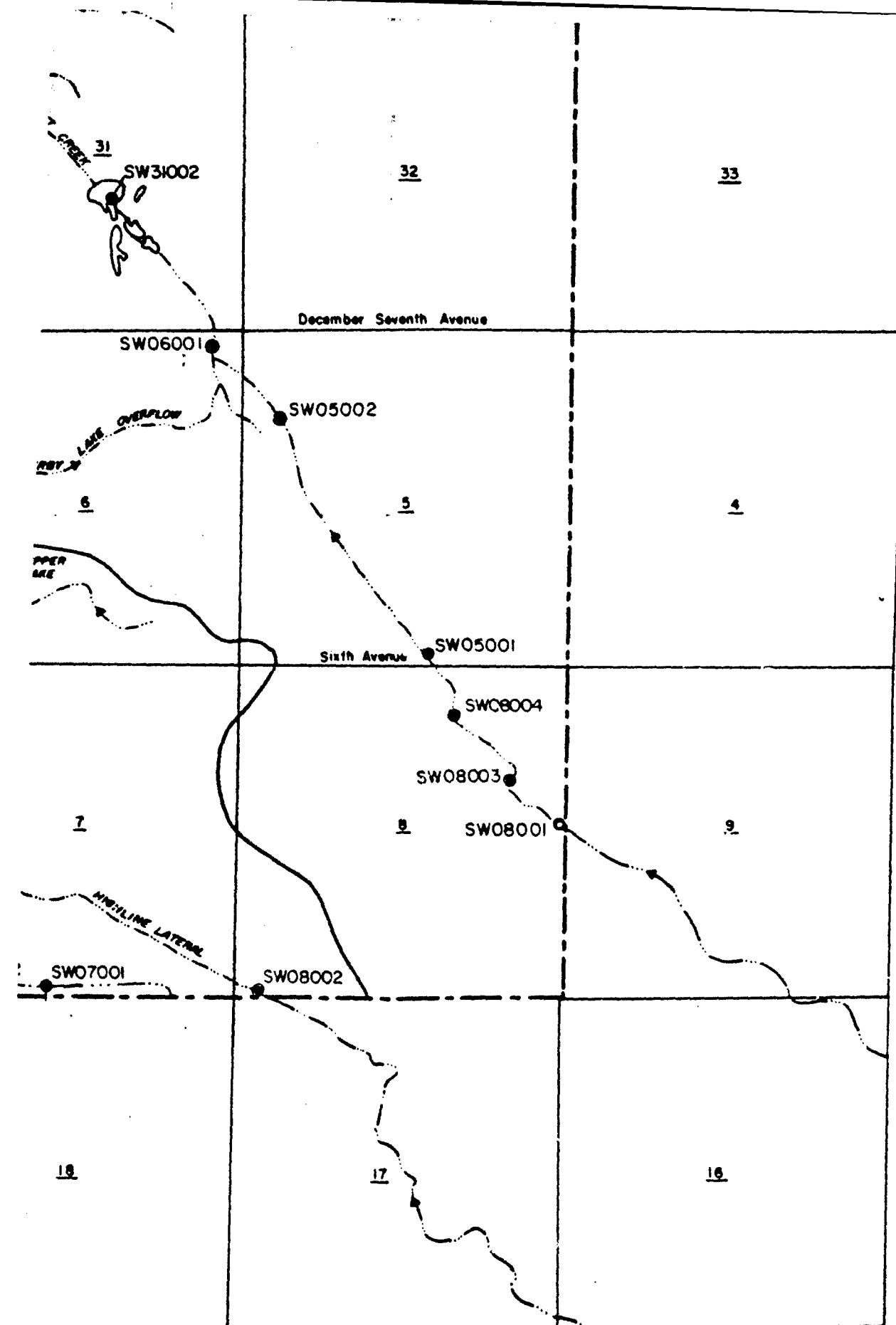
Drainage Basin Boundary

(8)



(C)





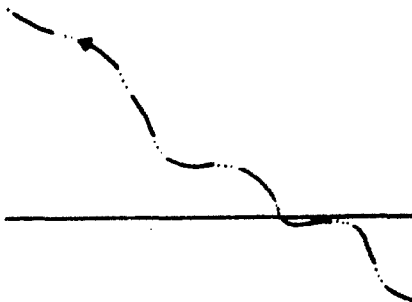
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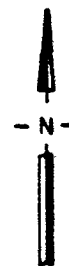
33

4

2



16



0 2000 4000
FEET

Prepared for:

U.S. Army, Program Manager for

Rocky Mountain Arsenal

Commerce City, Colorado

Prepared by:

R.L. Stollar & Associates, Inc.

Harding Lawson Associates

Plate 2.2-2

(a)

Surface-Water Quality Sampling Locations